

WHAT IS CLAIMED AS NEW AND DESIRED TO BE SECURED BY LETTERS
PATENT OF THE UNITED STATES IS:

1. A method, comprising:
5 hydrolyzing a sol-gel precursor in water to form a sol containing an organic solvent;
 removing said organic solvent from said hydrolyzed sol; and
 mixing said biological material with said hydrolyzed sol after said removing step.
2. The method according to claim 1, further comprising gelling said sol to form a gel
10 after said removing step.
3. The method according to claim 2, wherein said gelling step comprises raising a pH
of said hydrolyzed sol.
- 15 4. The method according to claim 1, further comprising immobilizing said biological
material.
- 20 5. The method according to claim 4, wherein said immobilizing step comprises
bonding covalently said biological material to said sol.
6. The method according to claim 1, wherein said removing step comprises distilling
said sol.
- 25 7. The method according to claim 1, wherein said hydrolyzing step comprises
dissolving said sol-gel precursor in said water, a pH of said water being below about 4.
8. The method according to claim 1, wherein said hydrolyzing step comprises
dissolving said sol-gel precursor in greater than 25 moles water per mole sol-gel precursor.
- 30 9. The method according to claim 1, wherein said hydrolyzing step comprises
dissolving an alkoxy metallate in said water.

10. The method according to claim 1, further comprising mixing a dispersant into said sol.

11. The method according to claim 1, further comprising functionalizing said sol.

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Sol Al
12. A method comprising:

providing a sol solution having less than 29 mole % organic solvents to make said sol compatible with a biological material; and
immobilizing said biological material by mixing said biological material into said sol.

10 13. A method comprising:

hydrolyzing a sol-gel precursor in water to form a sol containing an organic solvent;
mixing said biological material with said sol;
mixing a sufficient amount of a dispersant into said sol to cause macropores in a gel

15 formed by said sol.

14. A sol, comprising:

a species formed by the hydrolysis of P moles of a sol-gel precursor;
a sol solution including 71 mole % or more water and 29 mole % or less organic

20 solvents; and

a biological material,

wherein said sol solution is compatible with said biological material.

15. A sol, comprising:

25 a species formed by the hydrolysis of P moles of a sol-gel precursor;

W moles of water;

a sufficient amount of a dispersant to cause macropores in a gel formed by said sol;

and

a biological material.

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16. The sol according to claim 15, wherein said dispersant comprises a water-soluble polymer.

Sul a2 17. The sol according to claim 15, wherein a hydrolysis ratio of $W:P$ is greater than

25:1.

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18. The sol according to claim 15, wherein said sol-gel precursor comprises an alkoxy metallate.

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19. The sol according to claim 18, wherein said alkoxy metallate comprises an alkoxy silicate.

20. The sol according to claim 15, further comprising a means for functionalizing a gel formed by condensation of said hydrolyzed species.

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Sul a3 22. The sol according to claim 21, further comprising a nutrient supply configured to support said biological cell.

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23. The sol according to claim 15, wherein said sol comprises a sol solution, said W

moles of water forming at least 71 mole % of said sol solution.

Sul a4 24. The sol according to claim 15, wherein said organic solvents comprise an organic by-product arising from a production of said sol-gel precursor.

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25. The sol according to claim 15, wherein a hydrolysis ratio of $W:P$ is greater than

100:1.

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